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**U.S. House of Representatives**  
**Committee on Homeland Security**  
**Subcommittee on Cybersecurity, Infrastructure Protection, and Security Technologies**

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**Introduction**

Good morning Chairman Lungren, Ranking Member Clarke, and distinguished members of the Committee. I thank you for this opportunity to testify today on behalf of the Department of Homeland Security (DHS) Science and Technology Directorate (S&T). My testimony today will describe the critical role of the laboratories – both DHS S&T laboratories and the external laboratories including those from within the interagency, universities and international partners – in supporting the missions of DHS as well as providing technology and knowledge solutions for a variety of interagency partners.

In the 1930s and 1940s, the U.S. national laboratories ushered in the Nuclear Age. In a monumental effort, scientists and engineers developed nuclear weapons that led to the end of World War II, served as a deterrent during the Cold War standoff, and continue to provide deterrence today. The threats we faced were different, but the laboratories that helped the United States prevail in the past remain integral to our nation's security. These facilities have redirected their work and joined with other national and international laboratories to provide technology solutions for the major threats and challenges we face as a nation today. From threats in cyberspace to homemade explosives to biological agents, the network of interagency<sup>1</sup> laboratories leverages American science and technology expertise for the benefit and protection of the nation.

The interagency laboratories provide invaluable capabilities that are unmatched in their relationship with the decision-maker and end-user. These capabilities are essential to the Department of Homeland Security (DHS), the Homeland Security Enterprise (HSE) and our nation's Research and Development (R&D) enterprise. In the current budget environment, there will be a temptation to fund near-term priorities while sacrificing the future. In my judgment, this would be a mistake. On a daily basis, the technologies and knowledge products developed by our laboratories are helping the DHS and law enforcement operators perform their jobs more efficiently, effectively, and safely. Many of these technologies and knowledge products require long-term investments to come to fruition.

**DHS S&T Value Added Proposition for Supporting the Homeland Security Enterprise**

The mission of DHS Science and Technology Directorate is to strengthen America's security and resiliency by providing knowledge products and innovative technology solutions for the

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<sup>1</sup> The term "interagency laboratories" is intended as an umbrella term to reflect both the DOE-owned national laboratories and the laboratories owned by other federal agencies such as DHS and DoD.

Homeland Security Enterprise. Accomplishing this mission requires a robust and vibrant system of laboratories.

Established under the Homeland Security Act of 2002 (HSA), under section 302 of the HSA, the Secretary, acting through the Under Secretary for Science and Technology, is responsible for, among other things, “conducting basic and applied research, development, demonstration, testing, and evaluation activities that are relevant to any or all elements of the Department . . .”<sup>2</sup> However, the reach of DHS S&T extends well beyond the operational components of the Department. The S&T Directorate works closely with our partners at all levels of the Homeland Security Enterprise, including first responders, state, tribal, territorial and local governments, and private industry.

To meet the diverse needs of the Homeland Security Enterprise, DHS S&T pursues a strategy which is *operationally focused, highly innovative, and founded on building partnerships between operators and scientists and engineers across the dynamic R&D landscape*. To this end, S&T provides the HSE with strategic and focused technology options and operational process enhancements. S&T provides the technical depth and reach to discover, adapt, and leverage technology solutions developed by federal agencies and laboratories, state, local and tribal governments, universities, and the private sector – across the U.S. and internationally.

### **Gaining Operational Capacity and Innovation through Our Laboratories**

In the pursuit of high-impact technologies and knowledge products for the Homeland Security Enterprise, the S&T Office of National Laboratories (ONL) oversees and manages S&T’s laboratory operations, infrastructure and construction to support research, testing and evaluation, and technology development needs. These laboratories provide specialized technical expertise and world-class research facilities to DHS and other partners. Together, S&T’s five facilities support a diverse portfolio of capabilities to serve the Homeland Security Enterprise.

Built specifically for DHS, the **National Biodefense Analysis and Countermeasures Center (NBACC)** is a one-of-a-kind facility dedicated to defending the nation against biological threats. Located in Frederick, Maryland, this 160,000 square foot facility is a critical resource for understanding the risks posed by malicious use of biological agents. The capabilities contained in this facility did not exist prior to the Amerithrax attacks in 2001. NBACC consists of two centers. The National Bioforensic Analysis Center (NBFAC) conducts technical forensic analyses in support of attribution investigations. As a partner with the Federal Bureau of Investigation, the NBFAC is available to support operations 24 hours a day, seven days a week. The National Biological Threat Characterization Center (NBTCC) conducts experiments and studies to better understand the risks, vulnerabilities and hazards from current and emerging biological agents. Together, they possess a variety of scientific capabilities including genomics, aerobiology, bacteriology, virology, toxicology, and bioforensic studies. NBACC was recently awarded accreditation as a Biosafety Level 4 (BSL-4) facility, making it one of six such facilities in the United States. As a true interagency facility, NBACC brings DHS, law enforcement, defense, and Intelligence Community partners together to better defend against high priority biological threats.

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<sup>2</sup> 6 U.S.C. § 182(4)

The **Plum Island Animal Disease Center (PIADC)**, built in 1954, has served the front line of the nation's defense against diseases that could devastate markets for livestock, meat, and other animal products. Located off the tip of Long Island, the mission of PIADC crosses three areas: animal disease diagnostics, research and development, and education. With the U.S. Department of Agriculture and DHS staff, PIADC is capable of diagnosing Foreign Animal Diseases (such as Foot-and-Mouth Disease) and is working to develop countermeasures to such diseases. As a BSL-3 facility, its research programs include developing new diagnostic tools and preventatives (such as vaccines and antivirals) for Foot-and-Mouth Disease and other Foreign Animal Diseases. Since 1971, it has provided training to veterinarians on how to recognize Foreign Animal Diseases. Facility upgrades to this aging facility are underway to allow the laboratory to meet ongoing mission requirements in foreign animal disease research. One major recent accomplishment includes the completed field-testing of the first licensed Foot-and-Mouth Disease vaccine, which could be manufactured in the U.S.

The **Transportation Security Laboratory (TSL)** protects our nation's transportation systems through research, development, testing and validation of explosives technology detection systems. A key partner to the Transportation Security Administration (TSA) and based outside Atlantic City, NJ, testing at TSL helps S&T develop products related to explosive detection on persons and in checked baggage and small parcels, containerized cargo inspection, conveyance protection, and infrastructure protection. The laboratory has a long history of success, garnering international recognition for its role in the development of standards, protocols and test articles necessary for detection technology assessments. One such success was the Explosive Effects and Survivability Group's (EESG) rigorous testing of the Hardened Unit Load Device, a blast-resistant aircraft cargo container.

The **National Urban Security Technology Laboratory (NUSTL)** serves as a federal technical resource and authority to State and Local First Responders and promotes the successful development and integration of homeland security technologies into operational end-user environments. Located in New York, NY, this unique laboratory provides a testing, evaluation, and assessment test bed in a true urban environment. NUSTL supports the Domestic Nuclear Detection Office's (DNDO) Securing the Cities (STC) initiative, which seeks to design and implement architecture for coordinated and integrated detection, and interdiction of illicit radiological materials. In this pursuit, NUSTL uniquely supports local responders agencies' training and exercise events, adding to the overall goal of building self-sufficiency among the partners. In FY2011, NUSTL supported DNDO training of almost a thousand students in 24 Preventive Radiological and Nuclear Detection (PRND) classes. In addition to training support, NUSTL has tested over 6,000 radiation detectors for STC partners and other emergency responders, ensuring that each of these detectors works as specified. Between NUSTL's training support, technology testing, and the development of capabilities such as the Radiological Emergency Management System (REMS), the NUSTL lab is working to build a first response capability in New York City which is uniquely capable of preventing and responding to radiological events and could serve as a model for other large cities. Staff at NUSTL also develop low cost detection technologies such as the "thin profile dosimeter," for which DHS was granted a patent.

The **Chemical Security Analysis Center (CSAC)** provides a scientific basis for the awareness of chemical threats and the attribution of their use. Based in Edgewood, MD, CSAC draws upon

expertise in chemical defense, chemical agents, and toxic industrial chemicals. The Center analyzes chemical threat characterization data, including toxic industrial chemicals and chemical warfare agents, and integrates science-based risk assessments using physical, chemical, and toxicological information that is widely used. In an emergency, CSAC can support other agencies and organizations with expert analysis. For example, with the recent “Jack Rabbit” project, CSAC scientists gathered scientifically validated data on an accidental release of toxic inhalation hazards for chemical release models, shelter-in-place guidance, hazard assessment at rail transit and chemical storage facilities, and improved planning, response, and mitigation strategies.

A potential replacement for the aging PIADC is the **National Bio and Agro-Defense Facility (NBAF)**, which is currently awaiting construction in Manhattan, Kansas. Authorized for construction under the Department of Homeland Security Appropriations Act, 2009 (P.L. 110-329, Div. D. Sec. 540), NBAF was expected to be fully offset by the proceeds from the sale of Plum Island. Since then, the financial landscape has changed significantly. Today, we face the overall funding constraints of the Budget Control Act of 2011 (P.L. 112-25), which are impacting both the Department and S&T’s budgets. Additionally, due to the current economic climate, the sale of Plum Island is not likely to provide adequate funds in the foreseeable future requiring appropriated funds for construction, and estimated construction costs for NBAF have increased by more than 30 percent as a result of construction delays and additional safety engineering requirements. At the same time, Congressional appropriations have not kept pace with the costs to build the facility expeditiously.<sup>3</sup> Given these fiscal challenges while considering the evolving security threats to U.S. agriculture, we have asked the National Academy of Sciences (NAS) to convene an expert committee, in conjunction with the interagency, to conduct a scientific assessment of the requirements for a large-animal foreign and emerging diseases research and diagnostic laboratory in the United States.

While there is no current large animal Biosafety Level 4 (BSL4) facility like NBAF operating in the US, the challenge of building NBAF highlights the dilemma faced by all Federal government research and development (R&D) organizations as they balance funding priorities for infrastructure and for research in a constrained budget environment. Effective innovation is the core of the U.S. economy and U.S. national security; it requires investment in both facilities and research and development (R&D). The U.S. must robustly fund both of these activities in order to maintain the capability needed to respond to the diverse threats against which the DHS is charged to protect the United States.

To maximize the effectiveness of our labs, DHS S&T has been working diligently to bring these diverse facilities together to develop a shared sense of purpose for this critical mission; this will ensure a higher degree of focus and customer alignment. In January, leadership from each of the labs came together for the first time to discuss development of a corporate vision for the S&T laboratories. We have already seen important results from this meeting in just the few months since. For example, although the communities they serve are largely different, NUSTL and CSAC labs have found common interest in testing chemical detectors in a first responder environment. We are currently developing a corporate vision for our labs which includes fostering common best practices. These kinds of collaborative relationships are now explicitly

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<sup>3</sup> In FY 2012, Congress appropriated \$50 million of the \$150 million the Administration requested for NBAF.

part of the S&T focus, and we will continue to provide opportunities and oversight to encourage superior collaboration.

### **Building Key Partnerships Outside DHS S&T**

Building upon our significant internal laboratory capabilities, we have developed a network of external partners which includes DOE and other interagency, university (through our DHS Centers of Excellence (COE) program) and international laboratories which provide necessary collaboration and important economies in these lean fiscal times. They also serve as a foundation for achieving our value-added proposition.

#### *Department of Energy (DOE) Laboratory Partnerships*

The DOE National Laboratories play a critical role in assisting S&T in providing innovative science-based solutions to complex homeland security problems. S&T selects the best performer-based technology projects relying on a variety of factors, including the type of project deliverable (e.g. prototype, knowledge product, or demonstration), technical area of expertise, and cost.

The DOE National Laboratories are particularly well-suited to provide multi-disciplinary research and development capabilities to solve complex national security problems. The National Labs possess a legacy of excellence in scientific discovery, including 48 Nobel Prize winners since 1977 and over 800 *R&D 100* awards. The world-class facilities that make up the National Labs allow for multi-disciplinary research, including leading-edge work with: advanced scientific computing research, material sciences, basic energy sciences, biological and environmental research, high-energy physics, and nuclear physics. Certain labs possess unique facilities and infrastructure that are not found in the private sector. These capabilities include super-computing for biodefense activities and testing for certain characteristics of homemade explosives.

The focused work of the DHS-DOE National Laboratory network has introduced significant technology innovations and knowledge products for the Homeland Security Enterprise. For example, innovations from Lawrence Livermore National Laboratory (LLNL) and Sandia National Laboratory (SNL) are spearheading explosives trace detection systems used to more rapidly screen passengers and cargo at airports. Advances in the development of a resilient electric grid are being performed with the collaboration of Oak Ridge National Lab (ORNL), Argonne National Lab (ANL), and Pacific Northwest National Lab (PNNL). The recent, highly successful deployment and demonstration of the Recovery Transformer Project (RecX) stands to dramatically reduce downtime in the event of a large-scale power outage; a highly valuable technology tool developed by Idaho National Lab (INL). These technologies and many other innovations from our National Labs are helping the Homeland Security Enterprise become more resilient, efficient, and effective in executing the DHS missions.

Since joining DHS S&T in August 2011, I have been meeting with our partners at the DOE National Labs. At a recent trip to Sandia National Laboratory, I saw a demonstration of their capabilities with homemade explosives mitigation, cybersecurity, cutting-edge biological agent characterization, and many others. I have also met with Pacific Northwest National Lab,

Lawrence Livermore National Lab, and Oak Ridge National Lab to hear about the work they are doing on behalf of DHS and to discuss further collaborations. I am preparing to attend demonstrations at Oak Ridge National Laboratory and also at DOD's MIT Lincoln Laboratory this year. These visits are not just for information sharing and interagency discussion. Visits like this help S&T leadership make informed decisions about where our investments are able to ensure the biggest impact and the most effective transition to the field.

#### *Other Laboratory Partnerships*

No discussion of research and development laboratories would be complete without a mention of the other laboratories that support the HSE. DHS also relies on collaboration and support from laboratories across the interagency, such as those within the Department of Defense (e.g. laboratories within the Services) and National Institutes of Standards and Technology (NIST) within the Department of Commerce. Recent meetings with the Army's Picatinny Arsenal in New Jersey have focused on the development of a software interface that will allow the current families of command and control software to communicate between state and local fusions centers, first responders and the military support to civil authorities components to more readily share critical information in times of disaster.

The S&T Centers of Excellence (COE) also provide the Department direct and important access to laboratories within academia. The S&T Office of University Programs (OUP) coordinates these valuable partnerships with laboratories across the nation. These diverse Centers of Excellence provide access to cutting-edge capabilities in such areas as cybersecurity, biodefense, and disaster mitigation to name a few. Recent efforts have provided important operational capacity as well as highly innovative solutions that have had an immediate impact. Examples include the Coastal Wave Surge Model from the Coastal Hazards Center at Jackson State University and UNC-Chapel Hill. Recently, this COE allowed the U.S. Coast Guard to track the likely storm surge and wave impact of Hurricane Irene and quickly share those data with operational partners.

A final sector of laboratory collaboration extends beyond the borders of the United States. Leveraging the expertise and capabilities of our international partners allows us to not only jointly shoulder the financial burden but also benefit from the unique perspective of our allies. For example, DHS S&T is pursuing agreements with the governments of Canada and Australia to collaborate on work with agricultural biodefense. These agreements not only improve information sharing and the exchange of best practices, they provide a minimum response mechanism as the U.S. develops its own BSL-4 agriculture capability. In addition to biodefense, DHS S&T engages internationally on diverse priority areas facing the Homeland Security Enterprise.

#### **Supporting the Laboratories and Bringing Value to the Homeland Security Enterprise (HSE)**

Funding research at our various laboratory partners while managing the S&T internal laboratories represents a significant investment from DHS. The direct reimbursement from S&T to our external lab partners and the maintenance, operation, and research costs of our internal labs was \$241.6 million (\$100 million for S&T Lab operations, \$38 million for research and, \$103.6million for DOE) in FY11. Under the Department's FY 2012 appropriation, the S&T

R&D budget was cut by 56 percent, resulting in eliminating over 100 ongoing projects, overall. Despite all of the budget turbulence, the maintenance and operations funding for the S&T internal laboratories has remained relatively constant.

The value of these laboratories has been recognized by many DHS components as well, which have been keen to take advantage of the technical expertise and reach offered by these facilities. For FY11, DHS invested over \$300 million at DOE labs. The three largest component investors for FY11 were DHS S&T, the Domestic Nuclear Detection Office (DNDO), and Customs and Border Protection (CBP). These investments partially support laboratory overhead costs for research activities.

The FY 2013 budget request includes funding for critical Research and Development (R&D) programs to improve homeland security through state-of-the-art solutions and technology. The proposed R&D funding level in FY 2013 is commensurate with that in FY 2011 and will enable S&T to support the needs of frontline operational components, while conducting R&D work in priority areas such as: Explosives (aviation security); Bio-Threat Security; Cyber Security; and First Responders. Programs receiving funding were carefully chosen to ensure high priority initiatives maintain adequate funding. The increases are as follows:

- Biological defense – \$58.2M: S&T will focus on the development of tools to detect either an intentional or natural biologic event, with a focus on rapid point-of-care bio-diagnostic technologies, cost-effective indoor sensors, bioforensics, and mandated CBRN risk assessments.
- Explosives defense – \$44.4M: S&T's efforts will concentrate on technologies that assist TSA and other partners in detecting explosives, with an emphasis on Home Made Explosives (HMEs) and other advanced threats.
- Cyber security – \$18.1M: S&T's Cyber Security Division is supporting the White House Comprehensive National Cybersecurity Initiative with a variety of unclassified research programs. S&T is the only funding agency in the U.S. Government for unclassified cyber security research that supports the public and private sectors, and the global internet infrastructure.
- First Responders – \$23.2M: As the only Federal organization that provides technical assistance to the First Responder community, S&T will continue efforts to identify technologies, formulate standards and develop knowledge products that enhance the productivity, efficiency, and safety of first responders. Priority investment areas include: interoperable communications, data sharing systems, field-ready detection equipment, and enhancements to protective gear.

The balance of FY 2013 funding level will allow S&T to resume R&D work in important areas that received little or no funding in FY 2012 such as: Border Security, Chemical Attack Resiliency, Counterterrorism R&D, and Information Sharing and Interoperability.

### **Building a Collaborative, Cross-Cutting Laboratory Network**

The importance of building collaborative partnerships between the diverse laboratories in this country cannot be overstated. In the pursuit of innovative products which maximize our use of

resources, DHS S&T is seeking interagency collaboration. In fact, the increasing pull on the same resources led the major national security departments and agencies – DHS, DOE, DoD, and the Office of the Director of National Intelligence (ODNI) – to form the Mission Executive Council (MEC), an executive-level forum at which strategic planning for the utilization of the DOE National Laboratory capabilities is coordinated and discussed.

The impetus for forming the council was to take collective stock of the technical capabilities required by the principal departments with national security missions (DoD, DHS, DOE, and ODNI) and to present them to DOE as a whole. Within the forum, the Mission Executive Council was developed to engage the charter members, fostering a better understanding of long-term mission needs and serving as an opportunity to partner with DOE to identify and preserve the mission essential capabilities that are stewarded by the National Laboratory Complex.

By collectively identifying joint scientific and technical requirements, we believe we are securing in an efficient manner the necessary resources to conduct our respective missions. The increased visibility across the national security community of our joint needs in response to evolving threats fosters a sounder and more efficient planning and operating environment. DHS's participation is directed by the Deputy Secretary of DHS along with the leadership of the Under Secretary of DHS S&T and the Director of DNDO.

## **Conclusion**

Our nation's laboratories provide an invaluable capacity that assist in evolving our understanding of current and future homeland security risks and opportunities, as well as creating new and innovative capabilities, knowledge products and process enhancements that will improve the Department's operational capacity today and in the future. Further, our laboratories allow us to share the costs, benefits, and ideas that are imperative to our national and homeland security and are in the very spirit of innovation and scientific discovery.

Our experiences are evidence that we must continue to invest in both the infrastructure and the science as we rise to meet the threats and challenges of the 21<sup>st</sup> Century that we face today and in the future.

Just as the national laboratories ushered in the Nuclear Era, we look forward to our system of laboratories bringing forward new ideas and capabilities critical to the enduring security of our Nation. We look forward to continuing to expand the network of laboratories including internal S&T, DOE, other interagency, university and international facilities. With this network as a foundation, we firmly believe that achieving our value added proposition – *operational focus, innovative, building partnerships* - in support of the Homeland Security Enterprise is within reach.

In this pursuit, I am honored to serve in a leadership position at the DHS S&T Directorate and look forward to your questions.